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Attorney Docket No. 205242
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jc832 U.S. PTO
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APPLICATION ELEMENTS

1. ☒ Utility Transmittal Form
2. ☒ Specification (including claims and abstract) [Total Pages 35]
3. ☒ Drawings [Total Sheets 7]
4. ☐ Combined Declaration and Power of Attorney [Total Pages]
 - a. ☐ Newly executed
 - b. ☐ Copy from prior application

[Note Box 5 below]

 - i. ☐ Deletion of Inventor(s) Signed statement attached deleting inventor(s) named in the prior application
5. ☐ Incorporation by Reference: The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Microfiche Computer Program
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ACCOMPANYING APPLICATION PARTS

8. ☐ Assignment Papers (cover sheet and document(s))
9. ☐ Power of Attorney
10. ☐ English Translation Document (if applicable)
11. ☐ Information Disclosure Statement (IDS)
 - ☐ Form PTO-1449
 - ☐ Copies of References
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (Should be specifically itemized)
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 - ☐ Enclosed
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17. If a **CONTINUING APPLICATION**, check appropriate box and supply the requisite information in (a) and (b) below:

- (a) ☐ Continuation ☐ Divisional ☐ Continuation-in-part of prior application Serial No. _____
Prior application information: Examiner _____; Group Art Unit: _____
- (b) Preliminary Amendment: Relate Back - 35 USC §120. The Commissioner is requested to amend the specification by inserting the following sentence before the first line:
"This is a ☐ continuation ☐ divisional of copending application(s)
☐ Application No. _____, filed on _____, and which designates the U.S."

APPLICATION FEES

APPLICATION FEES				
BASIC FEE				\$690.00
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total Claims	39 -20=	19	x \$18.00	\$342.00
Independent Claims	5 -3=	2	x \$78.00	\$156.00
<input type="checkbox"/> Multiple Dependent Claims(s) if applicable			+ \$260.00	\$0.00
Total of above calculations =				\$1,188.00
Reduction by 50% for filing by small entity =				\$(0.00)
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TOTAL =				\$1,188.00

UTILITY PATENT APPLICATION TRANSMITTAL

Attorney Docket No. 205242

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23. CORRESPONDENCE ADDRESS

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Signature

Date

June 30, 2000

Certificate of Mailing Under 37 CFR §1.10

I hereby certify that this Utility Patent Application Transmittal and all accompanying documents are being deposited with the United States Postal Service "Express Mail Post Office To Addressee" Service under 37 CFR §1.10 on the date indicated below and is addressed to: Commissioner of Patents and Trademarks, Box Patent Application, Washington, D.C. 20231.

Rick D. Madsen

Name of Person Signing

Rick D. Madsen

Signature

June 30, 2000

Date

Invention Title:

Inventors:

Majeed D. SALMAN	Redmond	Washington	
INVENTOR'S NAME	CITIZENSHIP	CITY OF RESIDENCE	STATE or FOREIGN COUNTRY

Be it known that the inventors listed above have invented a certain new and useful invention with the title shown above of which the following is a specification.

CROSS REFERENCE TO RELATED APPLICATIONS

This invention relates generally to computer systems, and
10 more particularly to the provision of help information and
features for various software and hardware components of a
computer system.

BACKGROUND OF THE INVENTION

15 As the operating systems, applications, and hardware
components of modern computer systems become increasingly
complicated and offer more features and functions, even an
experienced user would from time to time encounter questions
relating to various aspects of her computer system. Such
20 questions may include, for example, how to use a particular
feature of an application or a hardware device, how to modify
various settings of the system, how to find out what is wrong
when the computer is not performing as expected and how to fix
it, etc. In the early days of the personal computing era,
25 each piece of computer software and hardware by reputable
vendors typically came with one or more user's manuals, most
of them tended to be either too voluminous and difficult for
average users to use, or not comprehensive enough to provide
answers to many questions a user might have. Moreover, many

of them were not well organized to allow a user to find the right information easily. It was all too often that a user would dig through several volumes of manuals, and still could not find the information needed.

5 As more computer processing power and system memory became available, there was a significant improvement in the way computer help information was provided to the users. Specifically, help information regarding a software program or a hardware device may be organized by the vendor of that
10 product into different help topics that a user can access and view on the computer. For instance, if the user has question about a function or feature of an application, she can click on the help option on the menu bar and then try to find the help topic that provides the information. In addition to
15 selected help topics, an application or device may provide tours and/or tutorials to teach the user how to use the features and functions of the product. As the Internet has become popular and widely accessible, many software and hardware vendors have also set up online support centers on
20 the World Wide Web, where a user can search for technical information and obtain online technical support for diagnosis and troubleshooting. These newer approaches of providing help information have become so popular that many software and hardware products nowadays do not even come with old-fashioned
25 paper manuals.

Nevertheless, even with all the help topics and online support available, a user today may still find it a

frustrating experience trying to locate the right help topics for her questions or problems concerning her computer system. Often, a question may be of a relatively general nature and could involve several software and hardware components, and

5 the user has no idea which component is responsible for the problem. In order to find the answer, the user may have to go through the help contents of each of the components. Thus, with respect to the applications, the user has to launch each of the applications and search through the help topics it

10 provides. Similarly, for a hardware component, the user has to locate and launch the help program for that component and then go through its help topics. If the answer still cannot be found, the user may have to access the various vendor Web sites and go through the information provided there. In doing

15 so, the user often finds that the applications, hardware devices, and vendor Web sites each has its own way of organizing help contents and its own terminology, making it more difficult to navigate through the help contents to find the information needed. This process not only can be very

20 time consuming but also can cause significant frustration of the user. The unsatisfactory user experience in finding useful help topics also leads to higher costs of technical support services of the software and hardware vendors, as a user encountering a problem may be more inclined to call for

25 help rather than trying to find the answer by herself.

SUMMARY OF THE INVENTION

In view of the foregoing, the present invention provides a framework that unifies help contents from different sources and provides a single point of entry through which a user may
5 access help contents relating to different system software and hardware components. In this unified help framework, a help service maintains a database that contains data identifying a plurality of help topics pertaining to components of the computer system. The plurality of help topics are presented
10 in a user interface based on the data in the database to allow a user to locate a help topic of interest. For instance, the help contents may be presented in accordance with a taxonomy structure that allows a user to navigate through easily to locate a help topic of interest. The user interface may also
15 provide keyword and index search options. The contents of the help topics may reside locally or be accessible over the Internet, and may contain static as well as active components, such as scripts. The unified help framework is extensible, allowing the help topics and the taxonomy to be updated by
20 means of update packages. The application for providing the unified presentation of help topics can be launched by a user as well as from programs.

Additional features and advantages of the invention will be made apparent from the following detailed description of
25 illustrative embodiments, which proceeds with reference to the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

While the appended claims set forth the features of the present invention with particularity, the invention, together with its objects and advantages, may be best understood from the following detailed description taken in conjunction with the accompanying drawings of which:

Figure 1 is a block diagram generally illustrating an exemplary computer system on which the present invention resides;

10 FIG. 2 is a schematic diagram showing an embodiment of a Help Center for providing access to help contents in accordance with the unified help framework of the invention;

FIG. 3 is a schematic diagram showing a user interface window provided by a Help Center Application that serves as a single point of entry for accessing help contents for multiple system components;

FIG. 4 is a schematic diagram illustrating an example of a taxonomy structure used in the user interface of FIG. 3 for presenting available help topics;

20 FIG. 5 is a schematic diagram showing a Compiled HTML file for storing help contents;

FIG. 6 is a schematic diagram showing a data structure in a Help Center Database for holding metadata for mapping help topics to the help taxonomy;

25 FIG. 7 is a schematic diagram showing an example of the contents of a Local Content Store of the embodiment of FIG. 2;

FIG. 8 is a schematic diagram showing an example of a Content Authentication Store of the embodiment of FIG. 2;

FIG. 9 is a schematic diagram showing the an update package for updating the Help Center of FIG. 2; and

5 FIG. 10 is a schematic diagram showing an example of a package description file in the update package of FIG. 9.

DETAILED DESCRIPTION OF THE INVENTION

Turning to the drawings, wherein like reference numerals
10 refer to like elements, the invention is illustrated as being implemented in a suitable computing environment. Although not required, the invention will be described in the general context of computer-executable instructions, such as program modules, being executed by a personal computer. Generally,
15 program modules include routines, programs, objects, components, data structures, etc. that perform particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the invention may be practiced with other computer system configurations,
20 including hand-held devices, multi-processor systems, microprocessor based or programmable consumer electronics, network PCs, minicomputers, mainframe computers, and the like.

The invention may also be practiced in distributed computing environments where tasks are performed by remote processing
25 devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

With reference to Fig. 1, an exemplary system for implementing the invention includes a general purpose computing device in the form of a conventional personal computer 20, including a processing unit 21, a system memory 22, and a system bus 23 that couples various system components including the system memory to the processing unit 21. The system bus 23 may be any of several types of bus structures including a memory bus or memory controller, a peripheral bus, and a local bus using any of a variety of bus architectures.

The system memory includes read only memory (ROM) 24 and random access memory (RAM) 25. A basic input/output system (BIOS) 26, containing the basic routines that help to transfer information between elements within the personal computer 20, such as during start-up, is stored in ROM 24. The personal computer 20 further includes a hard disk drive 27 for reading from and writing to a hard disk 60, a magnetic disk drive 28 for reading from or writing to a removable magnetic disk 29, and an optical disk drive 30 for reading from or writing to a removable optical disk 31 such as a CD ROM or other optical media.

The hard disk drive 27, magnetic disk drive 28, and optical disk drive 30 are connected to the system bus 23 by a hard disk drive interface 32, a magnetic disk drive interface 33, and an optical disk drive interface 34, respectively. The drives and their associated computer-readable media provide nonvolatile storage of computer readable instructions, data structures, program modules and other data for the personal

computer 20. Although the exemplary environment described herein employs a hard disk 60, a removable magnetic disk 29, and a removable optical disk 31, it will be appreciated by those skilled in the art that other types of computer readable media which can store data that is accessible by a computer, such as magnetic cassettes, flash memory cards, digital video disks, Bernoulli cartridges, random access memories, read only memories, and the like may also be used in the exemplary operating environment.

A number of program modules may be stored on the hard disk 60, magnetic disk 29, optical disk 31, ROM 24 or RAM 25, including an operating system 35, one or more applications programs 36, other program modules 37, and program data 38. A user may enter commands and information into the personal computer 20 through input devices such as a keyboard 40 and a pointing device 42. Other input devices (not shown) may include a microphone, joystick, game pad, satellite dish, scanner, or the like. These and other input devices are often connected to the processing unit 21 through a serial port interface 46 that is coupled to the system bus, but may be connected by other interfaces, such as a parallel port, game port or a universal serial bus (USB). A monitor 47 or other type of display device is also connected to the system bus 23 via an interface, such as a video adapter 48. In addition to the monitor, personal computers typically include other peripheral output devices, not shown, such as speakers and printers.

The personal computer 20 may operate in a networked environment using logical connections to one or more remote computers, such as a remote computer 49. The remote computer 49 may be another personal computer, a server, a router, a network PC, a peer device or other common network node, and typically includes many or all of the elements described above relative to the personal computer 20, although only a memory storage device 50 has been illustrated in Fig. 1. The logical connections depicted in Fig. 1 include a local area network (LAN) 51 and a wide area network (WAN) 52. Such networking environments are commonplace in offices, enterprise-wide computer networks, intranets and the Internet.

When used in a LAN networking environment, the personal computer 20 is connected to the local network 51 through a network interface or adapter 53. When used in a WAN networking environment, the person computer 20 typically includes a modem 54 or other means for establishing communications over the WAN 52. The modem 54, which may be internal or external, is connected to the system bus 23 via the serial port interface 46. In a networked environment, program modules depicted relative to the personal computer 20, or portions thereof, may be stored in the remote memory storage device. It will be appreciated that the network connections shown are exemplary and other means of establishing a communications link between the computers may be used.

In the description that follows, the invention will be described with reference to acts and symbolic representations of operations that are performed by one or more computers, unless indicated otherwise. As such, it will be understood
5 that such acts and operations, which are at times referred to as being computer-executed, include the manipulation by the processing unit of the computer of electrical signals representing data in a structured form. This manipulation transforms the data or maintains it at locations in the memory
10 system of the computer, which reconfigures or otherwise alters the operation of the computer in a manner well understood by those skilled in the art. The data structures where data is maintained are physical locations of the memory that have particular properties defined by the format of the data.
15 However, while the invention is being described in the foregoing context, it is not meant to be limiting as those of skill in the art will appreciate that various of the acts and operation described hereinafter may also be implemented in hardware.

20 Referring now to FIG. 2, the present invention is directed to a framework for providing access to help contents that offers unified organization and presentation of help topics and other types of user-help features, such as trouble shooting and tutorials, etc., to enable a user to get the
25 needed help easily and quickly. A feature of the invention is the provision of a single point of entry (or portal) through which the user can find help contents pertaining to various

software and hardware components installed on the computer system, and such help contents may be either stored locally or obtained online and include both static and active contents. By providing all help features through a single point of entry in an organized and coherent way that facilitates easy navigation, the unified help framework of the invention eliminates the major cause of user frustration in getting needed help with conventional systems. The user no longer has to search for help topics and features that are scattered all over the system and various vendor Web sites and can only be accessed by launching individual applications or connecting to individual Web sites.

FIG. 2 shows an embodiment of the unified help framework in accordance with the invention. In this embodiment, the unified help functionality is provided by a Help Center 70. The main architecture of the Help Center 70 is made up by the following components: a Help Center Application 72, a Help Center Database 74, a Help Center Update program 76, a Script Library 78, a Local Content Store 80, a Content Authorization Store 82, and a Support Automation Framework (SAF) Registration Store 84. The functions of each of these components and how they interact to provide the unified help are described in greater detail below.

Turning first to the Help Center Application (HCAApp) 72, this component is the center piece of the architecture of the Help Center 70 and cooperates with the other components to provide the unified help functionality. One function of the

HCAApp 72 is to provide the single point of entry for accessing all available help contents as described above. To that end, the HCAApp 72 is responsible for providing a user interface that presents the available help topics and other help options for all software and hardware components of the computer system in a well-organized form that the user can navigate through to locate the desired help contents. In one implementation, the primary mode of display of user interface is an Internet Explorer (Microsoft) browser control, and the various help contents are included in HTML pages that may be static or have active contents, such as scripts.

For illustration purposes, an exemplary user interface window 90 that may be presented by the HCAApp 72 as a home page is shown in FIG. 3. In this exemplary user interface, a navigation bar 92 provides direct access to top-level pages, home, back, and exit functionality. A portion 96 of the core area of the window, which is entitled "Look for help" in the illustrated example, presents a taxonomy structure, which will be described in greater detail below, for the user to locate relevant help topics. Another portion 98 of the window 90 provides other help options, such as viewing tours and tutorials, finding a help topic in an index of help topics, etc. A search bar 100 allows the user to enter a keyword for a keyword search on the available help contents. The window also includes a portion 102 that presents a list of help topics that have been used recently. In accordance with an aspect of the invention, active help contents may be offered

to help the user fix a problem by trouble shooting or using system restore. In the illustrated example, those help options are presented in the portion 106 of the window entitled "Fix a problem."

5 As the user goes through the process of locating the help information, the core area of the window 90 can also be used to present new user interface information depending on selections made by the user. For instance, the core area may be used to display actual help contents or search results if
10 the user selects a help topic or performs a keyword search. The user interface for self-help problem fix or support automation for escalating problems to a vendor will also be displayed in the same core area. In this regard, the author of support automation help pages is given significant
15 flexibility in deciding what kind of user interface (e.g., HTML plus JavaScript, etc.) and how many pages to be displayed.

 In accordance with a feature of the embodiment, the available help topics are organized in a taxonomy structure,
20 which is presented by the HCAApp 72 in its user interface window. The user can navigate through this taxonomy structure to locate relevant help topics. Generally, the taxonomy structure is based on a hierarchical model in which the help topics are categorized into a tree-like structure with
25 multiple layers of categories and sub-categories. For illustration purposes, an exemplary taxonomy structure 110 is shown in FIG. 4, where A1, A2, etc. represent categories an

sub-categories, and T1, T2, etc. represent help topics. Each taxonomy node has a display string and a description that can be displayed in the user interface of the HCAApp and is preferably mapped to a unique ID so that the same node can be identified using various local languages. For example, the strings under the heading "Look for help" in FIG. 3 may represent the titles of the top-level categories in a taxonomy structure. When the user selects one of the top level categories, the HCAApp 72 displays in the core area of the user interface window the categories and help topics (if any) on the second level of the taxonomy. By selecting a category on the second level, the HCAApp displays the categories and help topics on the third level of the taxonomy. In this way, the user can navigate through the taxonomy structure until a relevant help topic is found.

The help topics in the taxonomy are the leaf nodes in the tree-like structure. In other words, a help topic does not have child nodes. Each help topic, however, may have multiple parents as shown in FIG. 4. Thus, the same help topic may exist under different taxonomy branches. In a preferred embodiment, in addition to the taxonomy structure, help topics may also be located by using a help topic index or a keyword search. It will be appreciated that not all available help topics have to be mapped into the taxonomy. For example, some help topics that are intended to be located by a keyword search may not quite fit in the taxonomy.

In accordance with an important aspect of the embodiment, the taxonomy installed on a given computer system is intended to be extensible so that category nodes on different layers and new help topics may be added, moved, or removed from the taxonomy structure using update packages as will be described in greater detail below. Thus, a vendor can customize the taxonomy by registering its own help topics and taxonomy nodes. Moreover, a vendor can also change the layout of the user interface window to customize the look and feel of the window. Thus, for example, a computer manufacturer that ships computers with software loaded may choose to design its own Help Center window to provide its own background graphics, display its logo 112, and add its own help taxonomy nodes and topics, etc. Nevertheless, in order to maintain the coherency of the taxonomy and some degree of resemblance among the taxonomy structures of different computer systems, it is preferable for the top one or two levels of categories to be predefined and used by all application and hardware vendors in designing the their customized Help Center windows and help contents.

In a preferred embodiment, the help contents are contained in pages in the HTML (Hypertext Markup Language) and may include scripts (e.g., JavaScripts, VBScripts) and objects (e.g., applets, ActiveX/COM). The contents of a help topic may also have links or buttons that can be selected to launch other applications, applets, etc. The help contents stored locally on the computer system are preferably in the form of

Compiled HTML (CHM) Help Files. As shown in FIG. 5, a CHM Help File 116 contains one or more HTML files 120 that provide contents for the associated help topic, a file 122 (referred to as an HHC file) which provides a table of contents for the CHM file, and a file 124 (referred to as an HHK file) that contains an index of the contents. Additionally, as will be described below, a file 144 (FIG. 9) (referred to as an HHT file) that contains "metadata" is used for providing the mapping between the individual help topics and the taxonomy structure. In one implementation, the HHT file 144 is written in the eXtensible Markup Language (XML) and specifies for each help topic in the CHM file the following data: the taxonomy node under which the help topic resides, the URL for the help topic, the title for the help topic, the keywords for help topic, and an optional description of the help topic. The HHT file may also contain an Action field for the help topic to specify whether the contents or mapping of the topic is being added, removed, or updated.

In accordance with a feature of the embodiment, each help topic is associated with a Universal Resource Locator (URL) that can be used to access the contents of that help topic. One important effect of using URLs to access help contents is that there is no distinction between local contents or online contents. Thus, in the case that the URL refers to a local directory, the HCAApp will retrieve the contents of the help topic from that local memory space. On the other hand, if the URL refers to a directory on the Internet, such as a vendor's

Web site, the HCAApp will access that directory to obtain the help contents if the computer is already connected to the Internet, and preferably can initiate the connection to the Internet if the computer is not yet connected.

5 In a preferred embodiment, the HCAApp 72 may be launched either by a user or from within an application. To launch the HCAApp, the user may, for example, select the Help menu item from the Start menu. Alternatively, the HCAApp may be launched by an application by calling a proper API of the system.

10 In accordance with an aspect of the embodiment, in some applications it may be desirable to take advantage of the HCAApp to access and display the help contents of a given help topic directly, i.e., without having to go through the user interface or the taxonomy structure. To that end, in a
15 preferred embodiment a simple "HCP" protocol is provided to allow the contents of a help topic to be accessed through the Help Center namespace. The HCP protocol is used to tell the Help Center where to retrieve the help contents that are stored on the system. The HCP protocol has the format:

20 hcp://<content-address>,

where <content-address> may be any of the following:

<content-address>	Description
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25 <HTTP URL>	Extracts the contents of the URL and displays them in the browser, no matter where the contents reside.
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C=US/memorystick.htm

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via the Help Center) wishes to display the Help Center user interface other than from the root of the taxonomy structure, she can specify the URI to that path. For instance, to display the "Security" section of the help taxonomy in the

5 Help Center user interface, the following path may be specified:

`hcp://system/Taxonomy.htm?path=Security`

where Taxonomy.htm is an HTML file that contains a script that takes in the "path" parameter in the query string and displays

10 the taxonomy from the "Security" level and onwards, rather than from the default top level of the hierarchy.

To access a help topic through the hcp namespace, an application may, for example, provide a launch point in an error message or a FAQ ("frequently asked questions") panel

15 displayed to the user. When the user selects the launch point, a proper API is called to launch the HCAApp. The hcp path is then used to go to the help topic, and the retrieved help contents may then be displayed.

To manage the various help topics available to the user,

20 the HCAApp 72 maintains a Help Center (HC) Database to store information about the help topics. In a preferred embodiment, the HC Database includes a table for storing the mapping between the taxonomy and the help topics. This table is used by the HCAApp for displaying the taxonomy nodes and help topics

25 for structured navigation.

For illustration purposes, FIG. 6 shows an exemplary data structure in the form of a table 130 in the HC Database 74 for

mapping the help topics to the taxonomy. There is one entry for each node in the hierarchy of the taxonomy structure. Each entry contains the following fields: an ID uniquely identifying that node, a parent ID for that node (which is NULL for top-level nodes), the display name of the node, a description (optional) of the node. If the node is a help topic (i.e., a leaf node of the taxonomy), the entry also includes a URL field containing a URL for retrieving the help contents, a keyword field that contains the keywords for identifying this help topic in a keyword search, and an index string for indexing the topic. It will be appreciated that this table in FIG. 6 is shown only as a simple example, and the entry in the database may include other fields relating to the help topic. For instance, such fields may include the type of help (e.g., help information, tutorial, diagnosis, etc.) provided, an identification of the owner of the help contents (i.e., the party that provides the help contents), etc.

In the illustrated embodiment, the various help contents installed on the computer system are all registered in the local content store. The use of the local content store addresses another aspect of security concerns relating to having multiple sources for the help contents stored locally on the computer system. Specifically, one vendor should not be allowed to tamper with the help contents provided by another vendor. As will be described in greater detail below, addition and modification of trusted contents may be by means

of update packages provided by vendors. To prevent one vendor from changing the trusted contents of another vendor, in one implementation as shown in FIG. 7, the help contents installed on the system are listed under their respective vendors. For example, the Help page named "fix.htm" registered by a vendor, ABC Company, is listed under ABC. Later, only an update package from ABC Company is allowed to modify or delete fix.htm. To prevent unauthorized modification of the Content Store, access to the Content store is limited only to the HCAApp. In this way, the Local Content Store provides each vendor with a secured directory into which the vendor can store its active help contents.

As mentioned above, the help contents for a help topic may be active, i.e., including active components such as scripts. For instance, certain help contents provided by a vendor may provide a fix to a known problem, which may involve the use of scripts to change system settings or modify certain files. Another important and related use of scripts is for support automation, where a user presents (or "escalates") an encountered problem to a support center of the vendor over the Internet. In such a case, the vendor may provide script-based support applications (called "support channels") to collect various system operation information for problem diagnosis and upload such information to the Vendor. Moreover, once the problems are identified, fixes can also be implemented by providing scripts to the computer to perform the corrective actions.

Because a script may take actions that have potential destructive effects, such as deleting critical files, the use of scripts may have serious security implications and thus should be closely controlled. In the illustrated embodiment, such control is achieved by requiring that the Script Library objects can only be accessed by "trusted" help contents that have been registered in the Authorized Content Store. As shown in the example of FIG. 8, the entries in the Content Authorization Store are the URLs for the trusted help contents, which may exist either locally or online (i.e., accessible through the Internet). When the script from the help content (e.g., a HTML Help page) requests one of the Script Library objects, the HCAApp verifies that the URL of that help content is listed in the Local Content Store. Access to the Script Library objects is allowed only if the URL is found in the Content Authorization Store 82.

As mentioned above, the HCAApp 72 preferably uses the Internet Explorer browser control as the primary mode of viewing the contents of a help topic, which may be active and include scripts. The IE browser control has a built-in security mechanism that will detect unknown or untrusted scripts included in the content pages and provide warnings to the user or refuse to execute such scripts. For active help contents that include scripts, the security mechanism of the IE browser control can be disruptive and may hinder the proper execution of the scripts. To avoid this problem, the trusted active contents that are registered in the Content

Authorization Store 82 are allowed to bypass the IE security mechanism. In other words, scripts from the registered files or directories can be executed within the Help Center without triggering the security mechanism of the IE Browser Control.

5 As mentioned above, one important form of active help contents is a script-based support application provided by a vendor for automated support. Before such support applications can be used, the applications and their vendors have to be registered with the Support Automation Framework
10 (SAF) Registration Store 84 (FIG. 2). The SAF Registration Store keeps information for registered vendors and information specific to the support applications.

One important feature of the unified help framework of the invention is its extensibility. In a preferred
15 embodiment, various help contents can be added to or removed from the computer system, and their taxonomy mapping, index, and search keywords can be changed, by means of an update package. As shown in FIG. 9, in one implementation, the update package 140 is a single cabinet (CAB) file that may
20 contain information for updating the HC Database, SAF Registration Store, the Content Store, and the local file system. For security reasons, the CAB file is preferably signed. The CAB file may have compressed therein a package description file 142, one or more HHT files 144, SAF Config
25 files 146, and update contents 148. All of these components in the package except the Package description file are optional. The package description file 142, which is an XML

file in one implementation, describes the other components contained in the update package, as well as actions to be taken with respect to them (e.g., adding or deleting). For illustration purposes, an example of such a package

5 description file 142 is shown in FIG. 10. The HHT file 144, as described above, provides the mapping between the topics in the update contents 148 (if any) and the taxonomy. The SAF Config file 146 is used for registering with or removing from the SAF registration store a vendor connection through which
10 active help contents may be accessed. The content portion of the update file contains CHM files as described above, HTML pages, or other things that are to be copied to the local file system. Contents that are copied to the local file system for use under the hcp:// namespace are stored on a per vendor
15 basis under the main Help Center directory.

When the Help Center (HC) Update program 76 receives the update package 140, it first verifies that the package is signed by a proper authority to ensure that the package did come from a trusted source, such as a vendor. To this end,
20 the package includes a certificate 150 (FIG. 9) that holds the vendor's name, a public key and other information, all of which are signed by the Certificate Authority using a private key. The HC Update program uses the certificate management APIs of the operating system to verify that the certificate
25 was not tampered with. The certificate management APIs are also used to extract the name and identification data of the vendor from the certificate.

Parameter	Value	Unit
Mean	1.2	mm
Standard deviation	0.5	mm
Minimum	0.5	mm
Maximum	2.0	mm
Median	1.0	mm
Mode	1.0	mm
Range	1.5	mm
Interquartile range	0.5	mm
Skewness	0.2	
Kurtosis	0.1	
Correlation coefficient	0.8	
Pearson's chi-square	15.2	
Fisher's exact test	0.001	
Logistic regression	0.95	
Survival analysis	0.75	
Principal component analysis	0.9	
Discriminant analysis	0.85	
Bayesian network	0.92	
Decision tree	0.88	
Support vector machine	0.91	
Neural network	0.93	
Genetic algorithm	0.94	
Ant colony optimization	0.96	
Particle swarm optimization	0.97	
Simulated annealing	0.98	
Tabu search	0.99	
Genetic programming	0.99	
Evolutionary algorithm	0.99	
Stochastic search	0.99	
Metaheuristic	0.99	
Optimization algorithm	0.99	
Machine learning	0.99	
Artificial intelligence	0.99	
Computer science	0.99	
Engineering	0.99	
Mathematics	0.99	
Physics	0.99	
Chemistry	0.99	
Biology	0.99	
Medicine	0.99	
Law	0.99	
Business	0.99	
Social sciences	0.99	
Humanities	0.99	
Arts	0.99	
Sports	0.99	
Recreation	0.99	
Technology	0.99	
Environment	0.99	
Health	0.99	
Education	0.99	
Government	0.99	
Religion	0.99	
Philosophy	0.99	
History	0.99	
Geography	0.99	
Anthropology	0.99	
Linguistics	0.99	
Psychology	0.99	
Sociology	0.99	
Political science	0.99	
Economics	0.99	
Statistics	0.99	
Probability	0.99	
Algebra	0.99	
Geometry	0.99	
Calculus	0.99	
Trigonometry	0.99	
Mathematics	0.99	
Physics	0.99	
Chemistry	0.99	
Biology	0.99	
Medicine	0.99	
Law	0.99	
Business	0.99	
Social sciences	0.99	
Humanities	0.99	
Arts	0.99	
Sports	0.99	
Recreation	0.99	
Technology	0.99	
Environment	0.99	
Health	0.99	
Education	0.99	
Government	0.99	
Religion	0.99	
Philosophy	0.99	
History	0.99	
Geography	0.99	
Anthropology	0.99	
Linguistics	0.99	
Psychology	0.99	
Sociology	0.99	
Political science	0.99	
Economics	0.99	
Statistics	0.99	
Probability	0.99	
Algebra	0.99	
Geometry	0.99	
Calculus	0.99	
Trigonometry	0.99	
Mathematics	0.99	
Physics	0.99	
Chemistry	0.99	
Biology	0.99	
Medicine	0.99	
Law	0.99	
Business	0.99	
Social sciences	0.99	
Humanities	0.99	
Arts	0.99	
Sports	0.99	
Recreation	0.99	
Technology	0.99	
Environment	0.99	
Health	0.99	
Education	0.99	
Government	0.99	
Religion	0.99	
Philosophy	0.99	
History	0.99	
Geography	0.99	
Anthropology	0.99	
Linguistics	0.99	
Psychology	0.99	
Sociology	0.99	
Political science	0.99	
Economics	0.99	
Statistics	0.99	
Probability	0.99	
Algebra	0.99	
Geometry	0.99	
Calculus	0.99	
Trigonometry	0.99	
Mathematics	0.99	
Physics		

1. A method of providing access to help information relating to components of a computer system, comprising:

presenting the plurality of help topics in a user interface based on the data in the help database;

retrieving help contents of the selected help topic; and
displaying the retrieved help contents.

3. A method as in claim 1, wherein the presenting presents the plurality of help topics in accordance with a taxonomy structure.

4. A method as in claim 3, wherein the help database contains data specifying a mapping between each of the plurality of help topics and a corresponding node of the taxonomy structure.

6. A method as in claim 1, wherein the help database contains data specifying a search keyword associated with said each help topic.

8. A method as in claim 1, wherein the help database contains data specifying an index string associated with said each help topic.

20 10. A method as in claim 1, wherein the help contents of
said selected help topic are stored in a file written in a
markup language.

11. A method as in claim 1, wherein the help contents of
25 said selected help topic include an active component, and the
displaying includes executing the active component.

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17. A method as in claim 1, wherein the retrieving includes obtaining a Unified Resource Locator (URL) associated with the selected help topic and obtaining the help contents for the selected help topic based on the Unified Resource Locator.

18. A computer-readable medium having computer-readable instructions for performing the method of claim 17.

19. A method as in claim 17, wherein the Unified Resource Locator for the selected topic identifies a local directory of the computer system.

5 20. A method as in claim 17, wherein the Unified Resource Locator for the selected topic identifies a location accessible to the computer system through a network.

21. A method as in claim 1, further comprising:
10 receiving a call from an application identifying a help topic; and
 retrieving help contents for the help topic identified in the call.

15 22. A computer-readable medium having computer-readable instructions for performing the method of claim 21.

23. In a computer system having a graphic user interface including a display and a user interface selection device, a
20 method of providing help contents pertaining to components of a computer system, comprising:

 displaying, in a user interface area, help categories on
 a taxonomy structure, said taxonomy structure categorizing a
 plurality of help topics pertaining to a plurality of
25 components of the computer system;

 upon receiving a selection of a help category on said
 taxonomy structure, displaying in the user interface area help

topics in the taxonomy structure under the selected help category; and

upon receiving a selection of one of the displayed help topics, displaying help contents associated with the selected help topic.

24. A computer-readable medium having computer-readable instructions for performing the method of claim 23.

25. A method as in claim 23, further including displaying an interface element for prompting a selection of performing a keyword search for help topics.

26. A method as in claim 23, further including displaying an interface element for prompting a selection of viewing the help topics by index.

27. A method of providing help contents to a computer system, comprising:

receiving a help service update package presenting modifications to a help service system on the computer system, said modifications including adding a help topic to the help service system; and

updating a help service database to include the help topic, the help service database containing data identifying a plurality of help topics pertaining to different components of the computer system.

28. A method as in claim 27, further including displaying a user interface to present the plurality of help topics for user access according to the data in the help service database identifying the plurality of help topics.

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29. A computer-readable medium having computer-readable instructions for performing the method of claim 28.

30. A method as in claim 27, wherein the receiving
10 includes authenticating the help service update package based on a certificate included with the help service update package.

31. A method as in claim 27, wherein the step of
15 receiving includes retrieving from the help service update package a package description file containing a description of the modifications presented by the help service update package.

20 32. A method as in claim 27, wherein the updating includes storing in the help service a mapping between the added help topic and a taxonomy structure categorizing the plurality of help topics identified in the help service database.

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33. A computer-readable medium having computer-readable instructions for performing the method of claim 32.

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a help service system on a computer system, comprising:

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39. A method as in claim 38, wherein the help contents includes an active component.

A system and method for providing help contents uses a framework for unified help access that provides a single point of entry through which a user may access help contents

5 relating to all system software and hardware components. The help contents from different sources are organized into a taxonomy structure that allows a user to navigate easily to locate relevant help topics. The contents of the help topics may reside locally or be accessible over the Internet, and may
10 contain static as well as active components. The unified help framework is extensible, allowing the help topics and the taxonomy to be updated by means of update packages. The application for providing the unified presentation of help topics may be launched by a user as well as from programs.

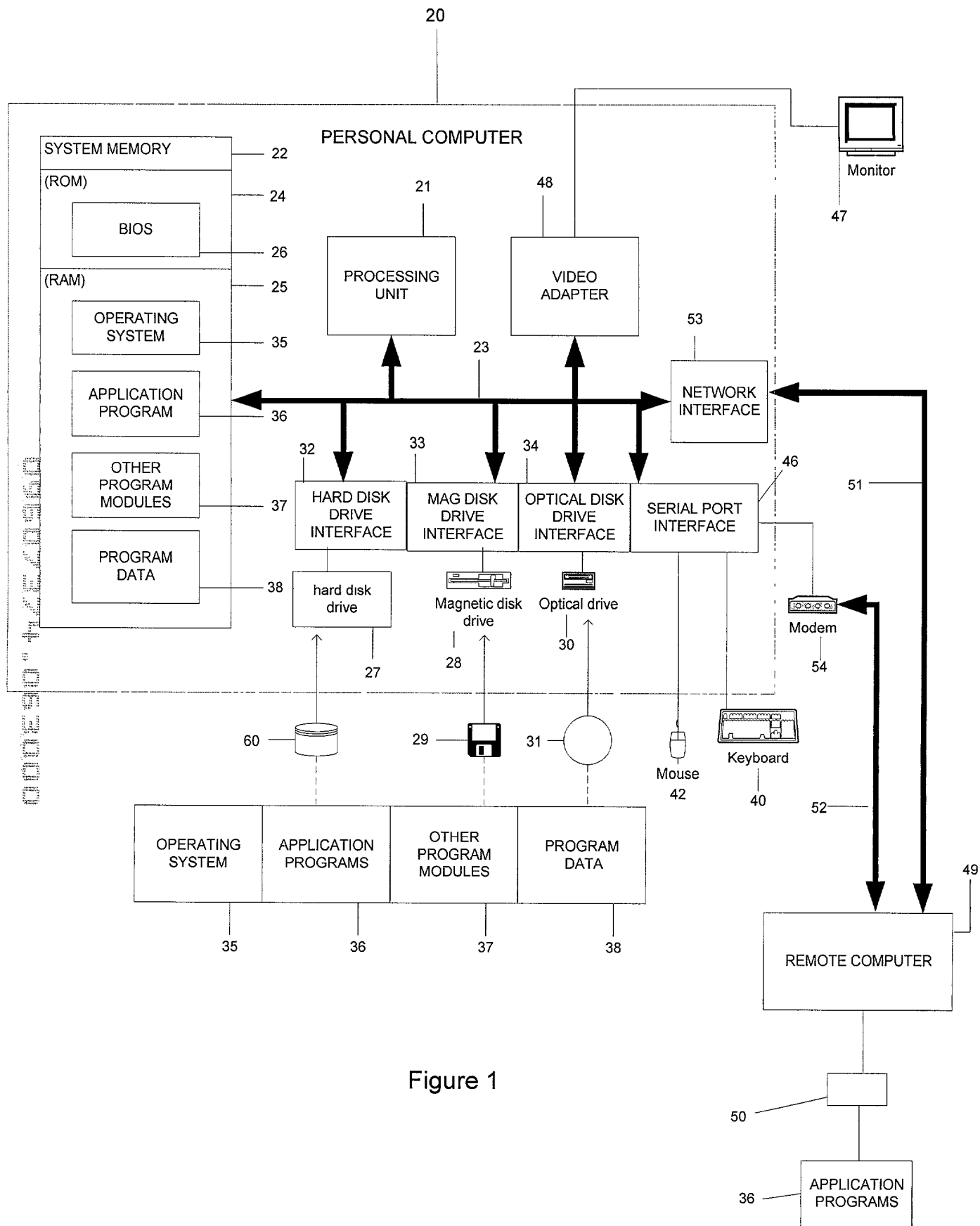


Figure 1

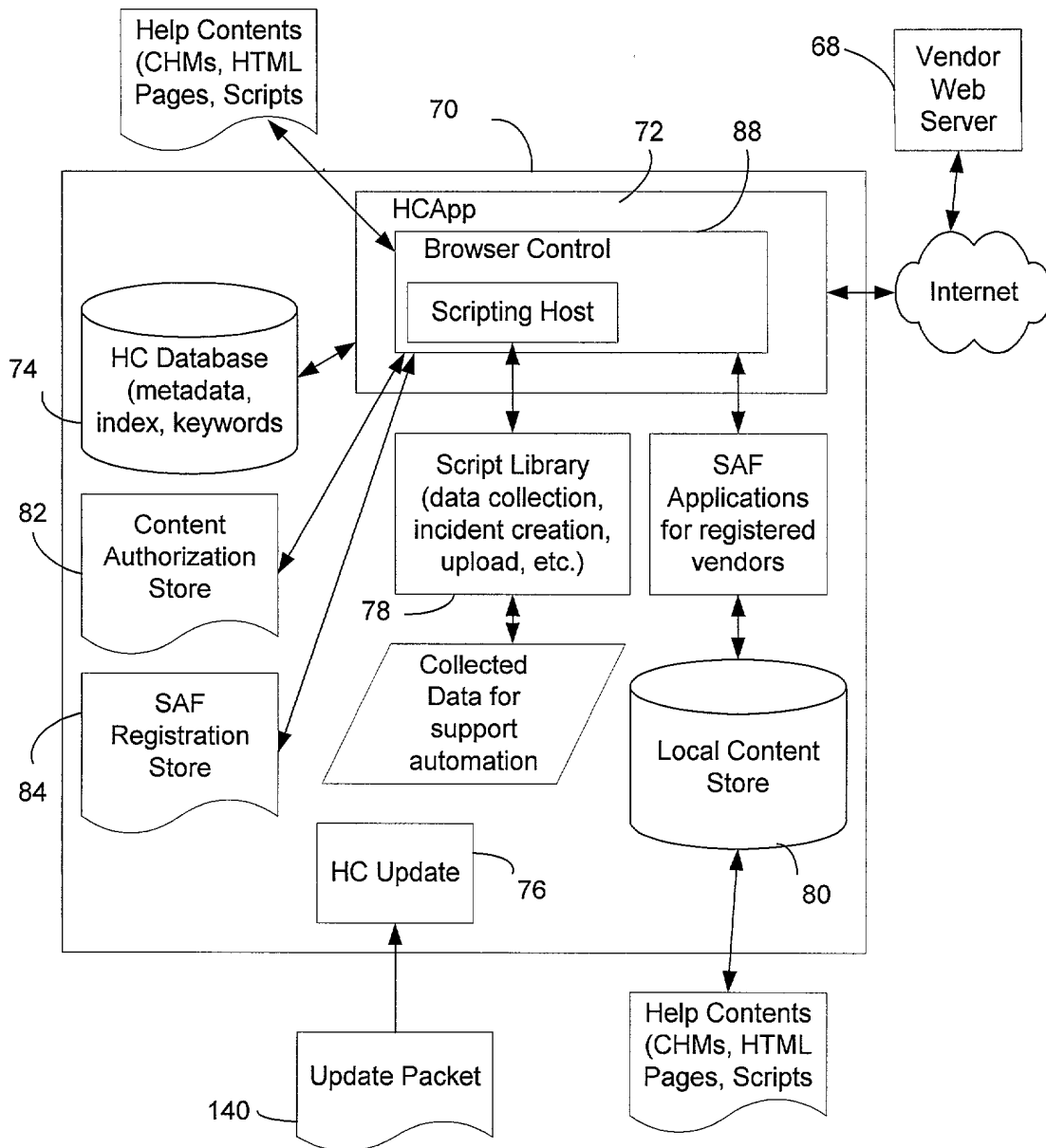
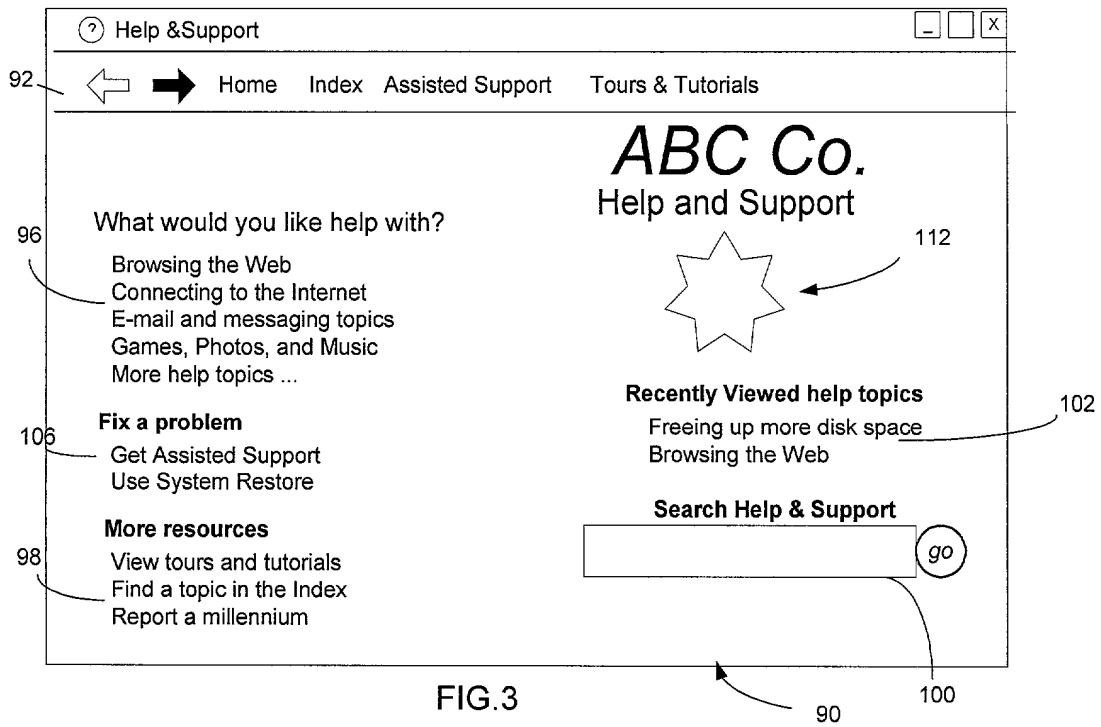


FIG.2



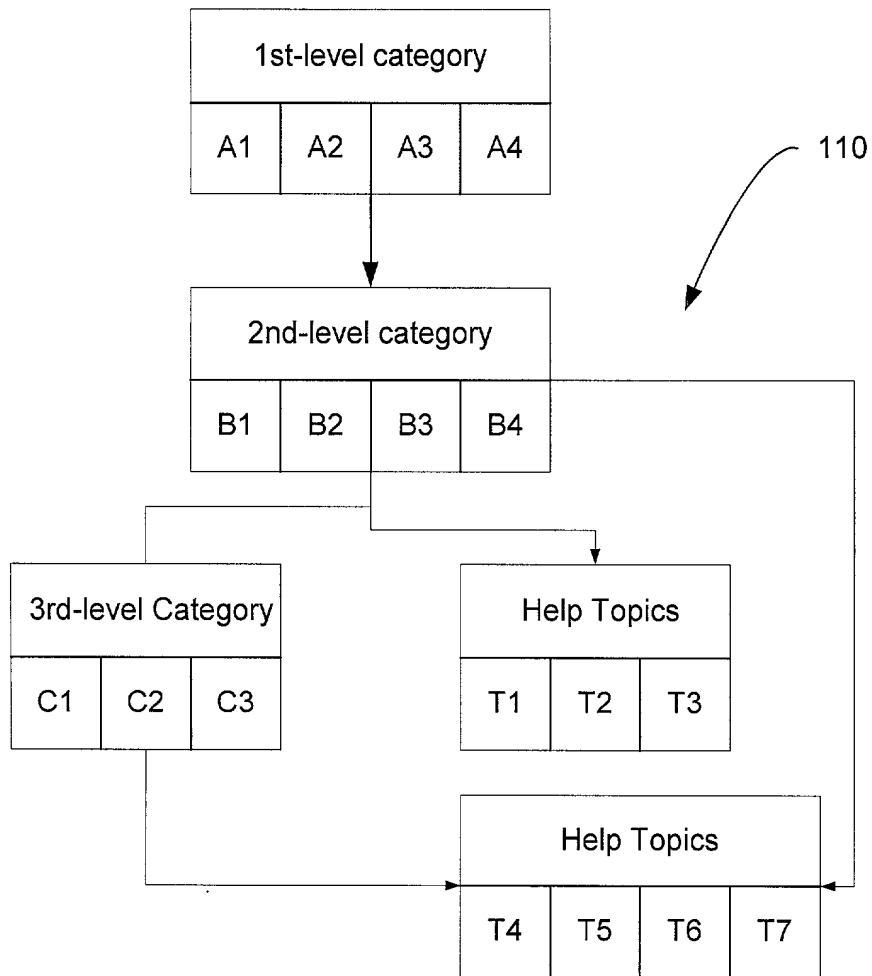


FIG. 4

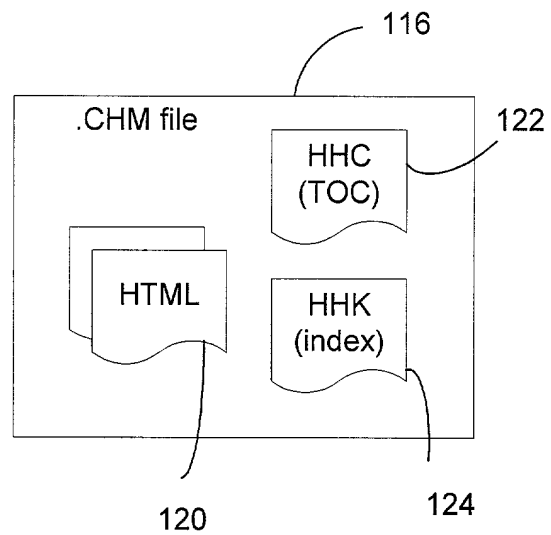


FIG. 5

ID	Parent ID	Display Name	Description	Topic URL	Keywords	Index
1	0	Audio	Organizing and editing audio	0	0	0
2	0	Printing	Printing documents	0	0	0
3	2	Change print settings	How to change printer settings	c:\Help\print_changing_setting.com	Printer settings	Change_Printer_Setting
4	2	Printer diagnosis	online diagnosis for the printer	http://printer_vendor/printer_diagnosis	Printer problem, printer diagnosis	Printer_diagnosis

FIG. 6

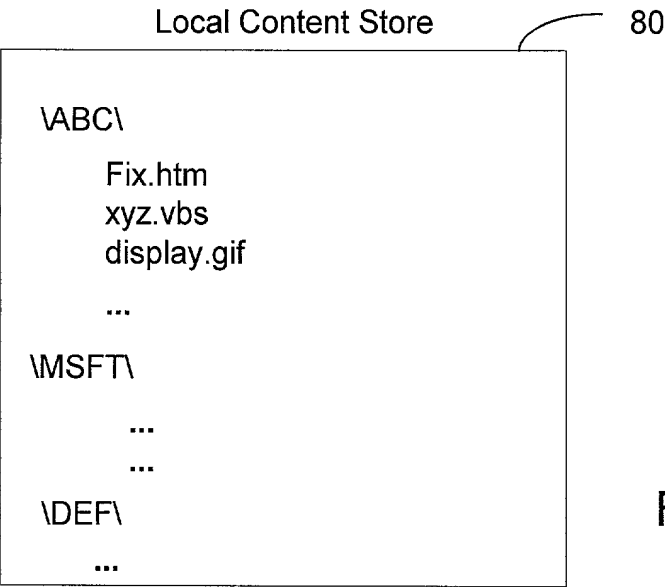


FIG. 7

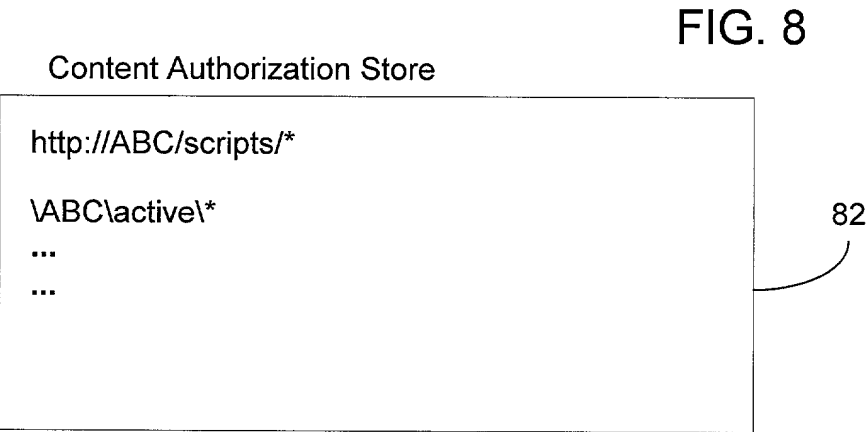


FIG. 8

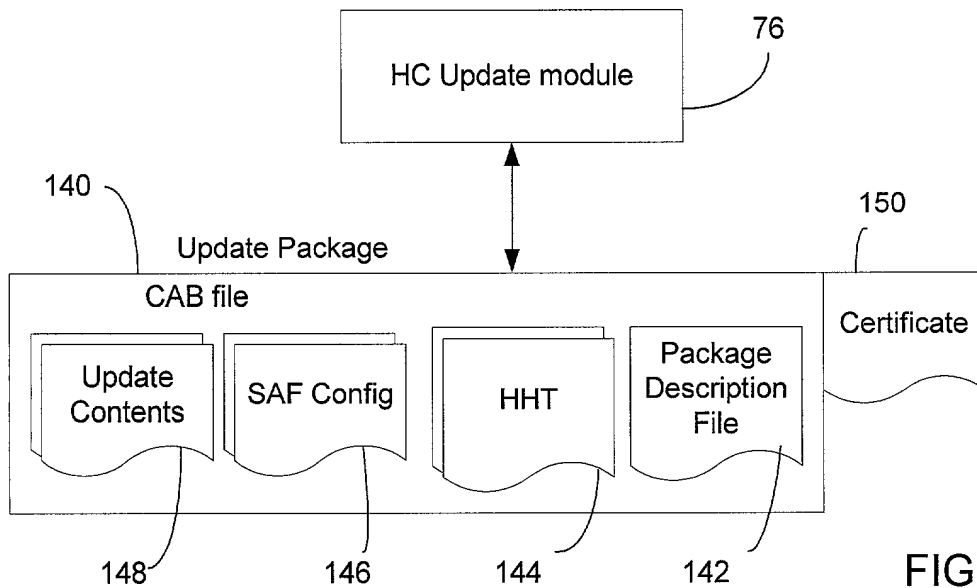


FIG. 9

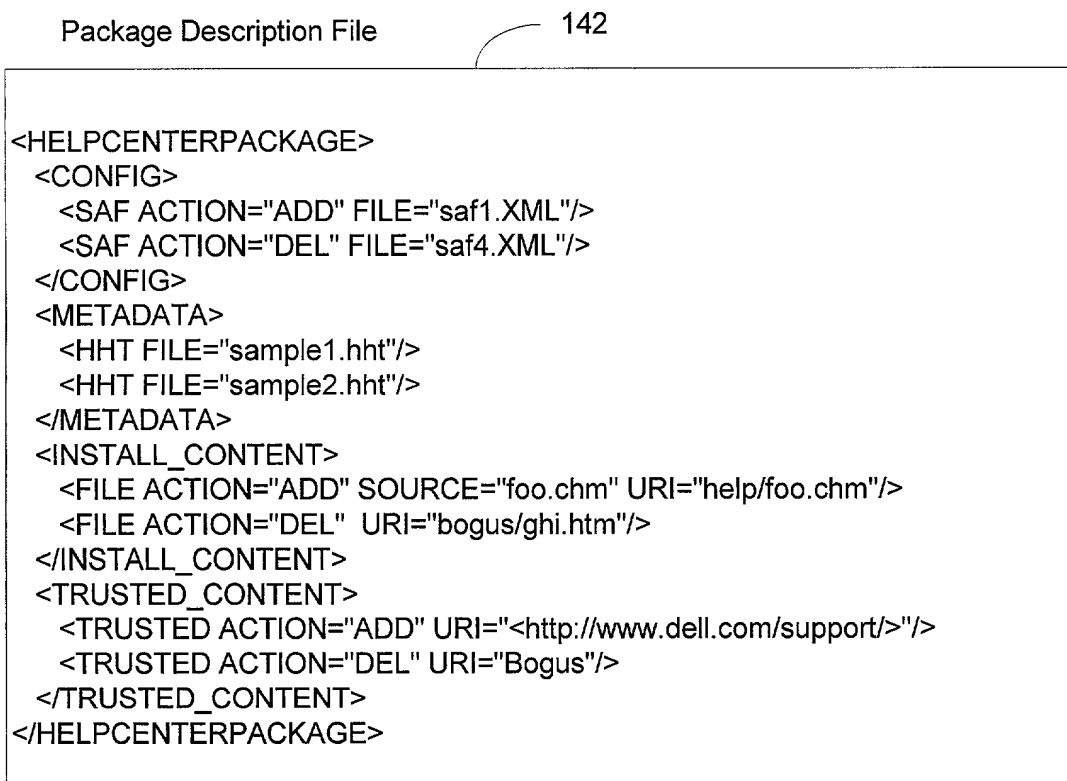


FIG. 10